COTTAGE POLLUTION CONTROL PROGRAM

PETERBOROUGH DISTRICT

CANAL LAKE

DALRYMPLE LAKE

MITCHELL LAKE

1975

Ontario
Ministry of the Environment

The Honourable George A. Kerr, Q.C., Minister

Everett Biggs, Deputy Minister

COTTAGE POLLUTION CONTROL PROGRAM

1975

PETERBOROUGH AND VICTORIA COUNTIES

(D)	(A)	MITCHELL LAKE	)	
(D)	(A)	CANAL LAKE	)	
(D)	(A)	DALRYMPLE LAKE	)	Victoria
	(A)	HEAD LAKE	)	County
(D)	(A)	BALSAM LAKE	)	
	(A)	LOONCALL LAKE	)	
	(A)	CHANDOS LAKE	)	Peterborough
(D)	(A)	RICE LAKE	)	County

(A) Abatement
(D) Detection

The field work outlined in this report was carried out by the staff of the Peterborough District Office, Municipal and Private Abatement Section.

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PREFACE

Ontario's thousands of beautiful inland lakes provide an abundant resource for recreational enjoyment. To protect the quality of these waters, a delicate environmental balance must be maintained.

A heavy influx of people may subject a lake and its surrounding environment to great stress. Uncontrolled development and imprudent use of our recreational lakes may cause their deterioration and destroy their natural qualitites.

The Ontario Ministry of the Environment is attempting to bring some of these stress factors under control by a variety of programs; one of these, the Cottage Pollution Control Program was initiated in 1970 to study the cottage waste disposal problem, to evaluate existing waste disposal systems and to enforce repairs to those found to be unsatisfactory.

The Ministry is also carrying on research to improve the knowledge of septic tank operation and the movement of sewage effluent in shallow soils. Alternative methods of private waste disposal are also being evaluated.

SUMMARY

During the summer of 1975, a total of 1427 disposal systems serving cottages in recreation areas were inspected. These were located in Peterborough and Victoria Counties in/near the Trent Waterway System. The major survey was on Canal, Mitchell and Dalrymple Lakes, in Victoria County, with 2 special request surveys being undertaken on Balsam Lake (Victoria) and Rice Lake (Peterborough).

Of all these systems, 19.4% were found to be satisfactory; 44.9% were seriously substandard; 25.6% were nuisances (wash water and toilet wastes); 7.4% were polluting the lake or ground water, and 2.7% were unclassified at time of inspection. (See Table I)

A total of 684 cottage drinking water samples were collected. Of these, 33% showed presence of coliform bacteria, which are pollution indicators. A further 1491 lake water samples were analysed: 12% of these samples contained sufficient coliform bacteria to render the water unsafe for swimming.

Following the detection survey, abatement work was initiated on Canal, Mitchell and Dalrymple Lakes. By March 1, 1976 73 have corrected their systems, and 50 others have signed agreements to do so.

Abatement work was also followed up on lakes previously surveyed in 1973 and 1974, i.e. Head Lake, Chandos Lake, Looncall Lake, and Balsam Lake. Of 313 cottages with problems outstanding, 284 have corrected their systems. Agreements have been made to complete corrections on 20 others during early 1976. The remaining 9 owners could not be reached and attempts will be made for a contact in the summer of 1976.

TABLE I

PRELIMINARY CLASSIFICATION OF SYSTEMS INSPECTED

PETERBOROUGH DISTRICT

1975

BODY OF WATER	NUMBER OF SYSTEMS INSPECTED	CLASSIFICATION OF SYSTEMS															
		SATISFACTORY		SATISFACTORY PERFORMANCE		SERIOUSLY SUBSTANDARD		NUISANCE (WASH WATER)		NUISANCE (SOLID WASTE)		DIRECT POLLUTER		UNCLASSIFIED TEMPORARILY		UNCLASSIFIED	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Canal Lake	583	8	1.4	99	16.7	284	48.7	117	20.2	16	2.8	48	8.3	11	1.9	-	-
Mitchell Lake	200	2	1.0	56	28.0	63	31.5	39	19.5	8	4.0	21	10.5	11	5.5	-	-
Dalrymple Lake	592	24	4.1	74	12.5	281	47.5	148	25.0	25	4.2	32	5.4	8	1.3	-	-
Rice Lake	36	3	8.3	7	19.4	6	16.7	5	13.9	1	2.8	5	13.9	9	25.0	-	-
Balsam Lake	16	-	-	4	25.0	6	37.5	6	37.5	-	-	-	-	-	-	-	-
	1427	37	2.6	240	16.8	640	44.9	315	22.1	50	3.5	106	7.4	39	2.7	-	-

DESIGN OF THE SURVEY

Preparation

The Cottage Pollution Control Program was established as early as 1971, cottages on Canal and Mitchell Lakes were mapped during a snowmobile reconaissance program carried out by staff from the Peterborough Office.

The snowmobile crews counted the number of establishments on the lake, photographed and described every one hundredth "control" establishment on the shoreline, plotted these cottages on maps and located non-cottage properties such as marinas, camp grounds and lodges.

Data obtained from the snowmobile work, as well as that from Cottage Owner's Association and other agencies, was used to prepare a work schedule for the student crews.

In order to present an accurrate current count, cottages on both lakes were re-numbered, and described during the spring of 1975. The numbering and description of cottages on Dalrymple Lake was carried out by the student crews themselves, prior to the survey in the summer.

Detection Surveys

Three crews, composed of two students each began the survey of each lake by reviewing the description log of cottages in which each establishment had been systematically numbered and accurately described.

Each establishment on consecutive lakes was then inspected with regards to: type of disposal system, location and design, soils type in area of all tile beds, presence of leaching pits or privies; to provide data on nature and depth of soil, source of drinking water and other related factors.

A preliminary classification of all waste disposal systems was made by the students prior to turning over the file to their supervisor for final classification.

One additional student was assigned to the field office; located in the Carden Municipal Offices on Dalrymple Lake, where she undertook typing and filing duties, along with answering enquiries from the general public either over the phone or directly.

Classification of Sewage Disposal Systems

All premises surveyed were classified into one of the following groups:

1. SATISFACTORY - A system which meets all current standards of good design, construction and location, and is properly maintained.

2. SATISFACTORY (ACCEPTABLE) PERFORMANCE - A system which may not quite meet current standards of design and construction but is properly located with respect to lake, well, etc., and maintained in good condition.

3. SERIOUSLY DEFECTIVE - A system which does not meet current standards of design, construction, and location and/or is in a state of neglect. The owner is notified of the deficiency and he is advised that consideration should be given to up-dating the system in the near future. Although, this system is not deemed to be causing pollution at time of inspection, a potential hazard exists.

4. NUISANCE (WASH WATER) - A system causing wash water to be exposed on the surface of the ground either directly through a waste pipe or escaping from a seepage pit or just thrown on ground surface. Wash water discharged from any sanitary fixture is contaminated and creates an unhealthy environment. Phosphates and other nutrients from waste discharges encourage weed growth and affects the aesthetic quality of the lake.

5. NUISANCE (TOILET AND SOLID WASTE) - A system causing a waste containing faecal or urinary discharges to be exposed on the surface of the ground, either directly through a pipe or escaping from some part of a sewage disposal system including a privy. Also, included in this classification, is "solid waste" or garbage of a kind which can cause a "nuisance", e.g. domestic garbage containing foodstuff.

6. DIRECT POLLUTER - A system which is permitting sewage to contaminate the ground water, or to reach the lake either by direct discharge through a pipe or ditch or over the ground surface.

7. UNCLASSIFIED (TEMPORARILY) - A system which has been given a preliminary classification by the student inspector where he feels he cannot use any of the preceding classifications and has doubts about the system or part of it. These systems require further inspections by the supervisor who will attempt to make a final classification after a thorough investigation.

8. UNCLASSIFIED - A system where it is not possible at the end of the survey to make a classification at that time. Usually they amount to only a few and include abandoned or ruinous premises.

WATER SAMPLING

The Public Health Laboratories provided the necessary water sample analyses to detect total and faecal coliforms in the lake water samples. These samples were important for the tracing of sources of pollution entering the lake. They were not taken in sufficient number or frequency to investigate the overall water quality of the lakes surveyed.

An extensive Water Quality Study had been carried out, previously, by the Ministry of the Environment on Dalrymple Lake, Canal and Mitchell Lakes in 1972. Copies of reports are available from the Ministry of the Environment, Technical Support Section, 7th Floor, 150 Ferrand Drive, Don Mills, Ontario, M3C 3C3.

During the cottage survey, drinking water samples were obtained when the owner was using an untreated water supply. These samples were analysed at the Public Health Laboratory and all owners having drinking water samples taken, were immediately informed of the results and instructions were also sent regarding procedures for disinfecting the drinking water supply, if found unsatisfactory. Of 684 drinking water samples taken, 225 or 33% were found unsatisfactory, that is, having total/faecal coliforms exceeding 4/0. (Table II)

Lake water samples were taken in front of each cottage, at their dock, or swimming area. The Ministry's booklet "Guidelines and Criteria for Water Quality Management, July 1974", indicates that water which contains more than 1000 Total Coliforms per ml. or more than 100 Faecal Coliforms per ml. is considered unsafe for total body contact recreational use.

Of 1491 lake water samples taken, 180 or 12% did not meet those requirements. (Table II)

In addition to the shoreline samples, "Control" samples were taken on all three lakes, approximately 150 - 200 ft. off-shore. In all the three series of samplings taken during the course of the summer, not one control sample exceeded the limits set for total body contact use.

ABATEMENT & CORRECTION PROCEDURE

After the file is examined by the supervisor, and the original classifications confirmed, the abatement officer then interviews the establishment owner to advise him of the findings and discuss corrective action. If the owner agrees with the findings, a corrective program is initiated and the owner signs an abatement agreement form stating the corrections which would be completed by a specific date. A final inspection is carried out upon completion of the corrective work, and the sewage disposal system is re-classified.

In the case of commercial establishments, this procedure is often more complicated requiring an engineering study and the submission of plans for approval with soils analysis report. In these instances, unless he is a direct polluter, the owner is contacted and is instructed to submit plans for the corrective measures to be completed prior to the opening of the next commercial season. A direct polluter must take corrective action immediately to prevent pollution of the lake.

Lake Water Criteria

Total Coliform 1000 (Max)
Faecal Coliform 100 (Max)

TABLE II

WATER SAMPLE RESULTS

1975

Drinking Water Criteria

Total Coliform 4 (Max)
Faecal Coliform 4 (Max)

LAKE	LAKE WATER SAMPLES			DRINKING WATER SAMPLES		
	Total	Safe	Unsafe	Total	Safe	Unsafe
Canal Lake	681	647 (95%)	34 (5%)	398	269 (68%)	129 (32%)
Dalrymple Lake	586	473 (81%)	113 (19%)	187	123 (66%)	64 (34%)
Mitchell Lake	224	191 (86%)	33 (14%)	99	67 (68%)	32 (32%)
TOTALS	1491	% of Total 88%	% of Total 12%	684	% of Total 67%	% of Total 33%

NOTE:
1. All owners of establishments where drinking water samples were taken were notified by mail of analyses results.
2. The designations "Satisfactory" and "Unsatisfactory" are in accordance with the drinking water sample interpretation chart pamphlet "Understanding the Bacteriological Report on your Drinking Water", produced by the Ontario Ministry of Health.
3. No drinking water sample was taken if drinking water was being treated.

METHODS OF SEWAGE DISPOSAL

Much of the shoreline property in the Kawarthas has minimal soil cover over bedrock and thus is unsuitable, in its natural state, for sub-surface sewage disposal. This can be remedied in some areas by importing granular material over an area capable of supporting a sub-surface sewage disposal system. The use of a holding tank may provide a more economical solution for the disposal of sewage and may be recommended if a contract for the pump-out of the tank can be secured. On some lots where there is restricted space for a sewage disposal system, the installation of a proprietary aerobic sewage treatment system may provide a viable alternative.

Recently there have been many developments in sewage disposal systems and the Ministry of the Environment is continually monitoring new systems being marketed in Ontario.

The Health Unit administering the septic tank program for the Ministry in the area must be consulted and approval obtained before any sewage disposal system is installed, altered, repaired or enlarged.

MITCHELL LAKE

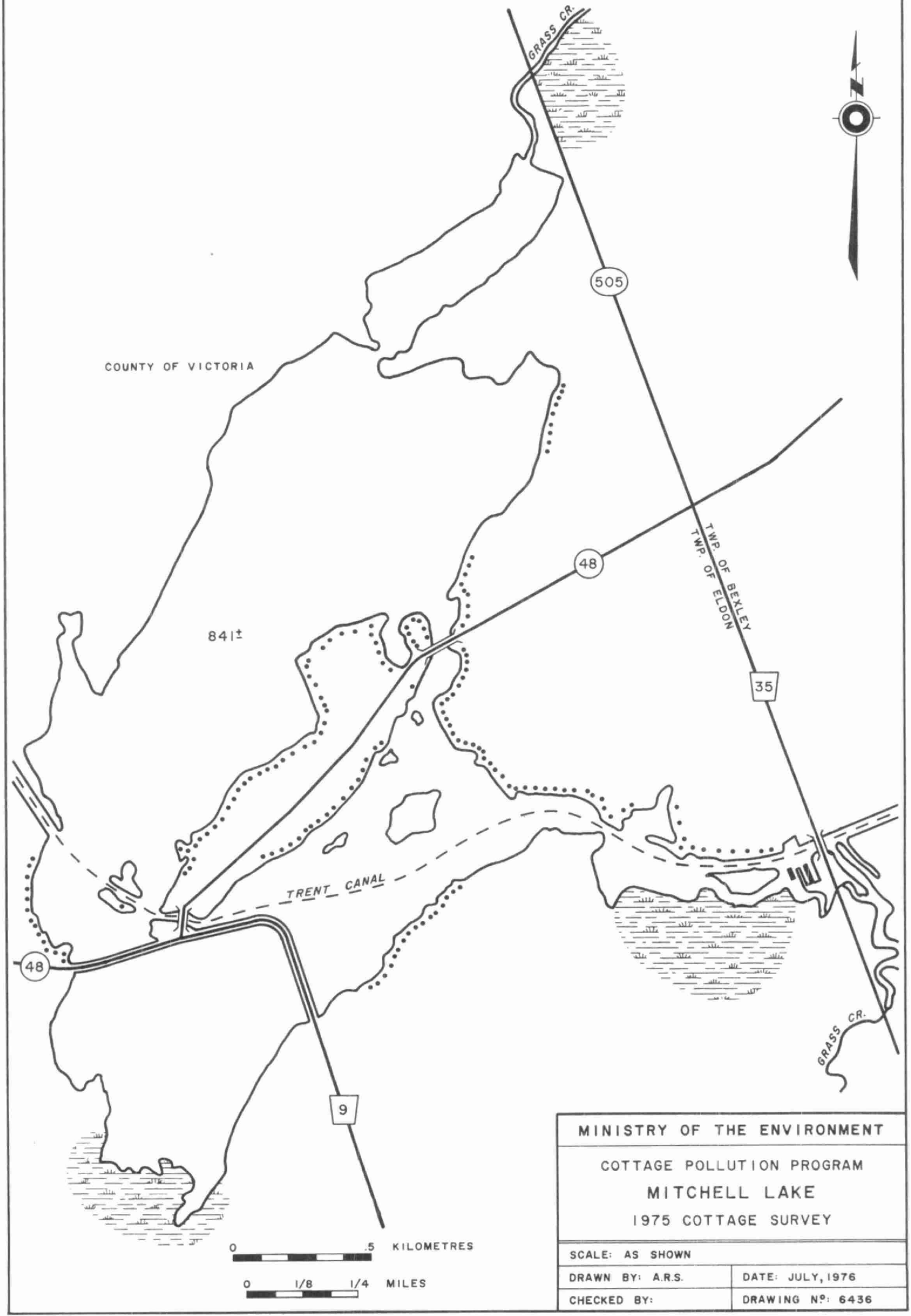
Mitchell Lake is located in Eldon Township, in the County of Victoria. This shallow, man-made lake is on the Trent Canal System, and in fact, is the highest elevation point (840.6 Ft.) along with Balsam Lake, in that section of canal between Lake Simcoe and Lake Ontario. Surface area is approximately 2 sq. miles and is composed of two sections bisected by Hwy. #48.

The area north of Mitchell Lake is quite flat, with gently rolling areas to the west and south-west. The soil types here are Farmington Loam and Dummer Loam respectively. The stony, fragmented overburden is quite shallow and in places exposed limestone bedrock can be seen north and south of the highway along the eastern shores.

Perhaps the most striking feature of Mitchell lake, is the profusion of stumps projecting just above the water, in most bays; these are remnants of the stands of trees cleared to make way for the flooding for the Canal System in about 1907.

Mitchell Lake is very shallow, and navigation by larger boats is restricted to the Trent Canal which has a minimum depth of 6 feet.

FIGURE I – COTTAGE DISTRIBUTION OF MITCHELL LAKE



MINISTRY OF THE ENVIRONMENT	
COTTAGE POLLUTION PROGRAM MITCHELL LAKE 1975 COTTAGE SURVEY	
SCALE: AS SHOWN	
DRAWN BY: A.R.S.	DATE: JULY, 1976
CHECKED BY:	DRAWING Nº: 6436

Weeds are a problem along most shorelines, but are particularly prevalent in the south east arm, where the canal enters from Balsam Lake. Water level fluctuations are not a problem as levels are controlled adequately by the Trent Canal Authority by a system of dams.

There is no commercial development on Mitchell Lake, i.e. marinas, resorts, but the shoreline is moderately developed with private cottages and residences. There are 200 shoreline cottages/homes with approximately an additional 20% backlots developed which have access to the lake. A public picnic area is located on the north section of the lake, where the canal passes under the highway. Several small islands are found in the lake, however, only one has a cottage.

Of the 200 sewage disposal systems inspected, only 58 or 29.8% were satisfactory; 63 others (31.5%) were seriously substandard; 39 systems (19.5%) had improper disposal of wash water, and 8 systems or 4% had improper toilet or solid waste disposal; 21 systems, or 10.5% were polluters, and 11 or 5.5% were unclassified at time of inspection. Most of the polluters were systems that were located in the water table. A total of 224 lakewater samples were collected during the survey; of these, 33 (14%) were found to be unsafe for recreational activities.

(More than 1000 total coliforms per ml. or more than 100 faecal coliforms per ml.) Of 99 drinking water samples obtained, 32 (32%) were found to be unsafe for human consumption. (More than 4 T.C. per ml. or more than O.F.C. per ml.) All cottage owners, where samples were taken, were notified by mail of their drinking water quality, whether good or bad.

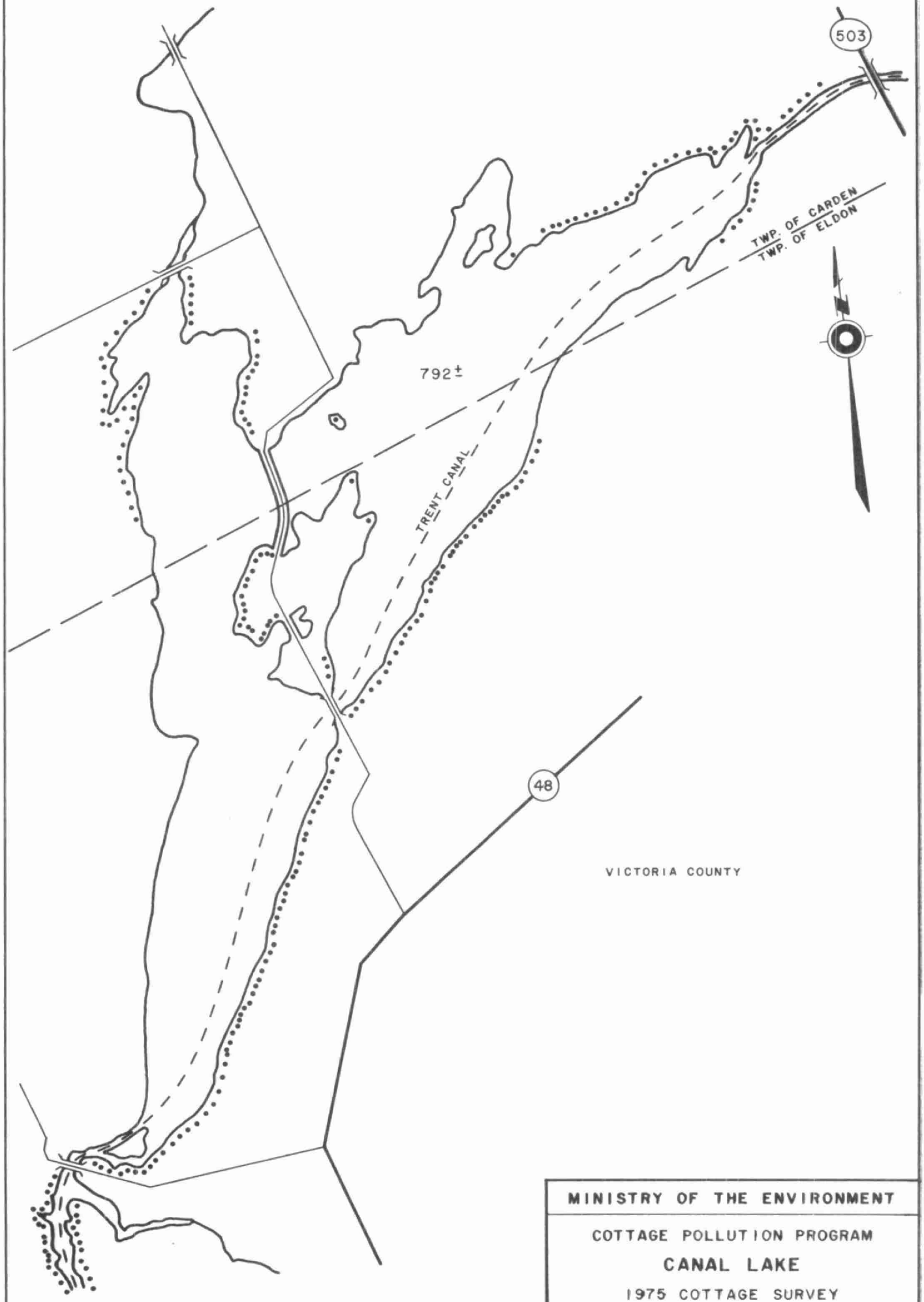
CANAL LAKE

Canal Lake, like Mitchell is part of the Trent Canal System. It also is a shallow lake and heavily weed infested. It covers approximately 4½ sq. miles; the northern 1/3 of the lake is in Carden Township and the balance is in Eldon Township, in Victoria County. A small portion of the lake or more accurately, that section of the canal known as the Talbot River, is situated in Mara Township, Ontario County. The survey was conducted between the canal lock south west of Bolsover and the Kirkfield Liftlock at the eastern tip of Canal Lake.

Soil depth is generally adequate over the majority of the lake's shoreline. The lands around the lake are partly under cultivation, and partly grazing land. Soil type is mostly Eldon Loam; the exception is the north eastern shoreline of the lake where soil type is Farmington Loam, a shallow mantle over limestone bedrock.

A large island in the centre of the lake is connected to the mainland by a causeway on the north, and a high level bridge over the canal, to the south. An extensive tent/ trailer campground as well as 30 private cottages are located on this island. There are a few other islands in Canal Lake; two of these each have one cottage located on them.

FIGURE 2 - COTTAGE DISTRIBUTION OF CANAL LAKE



MINISTRY OF THE ENVIRONMENT	
COTTAGE POLLUTION PROGRAM CANAL LAKE 1975 COTTAGE SURVEY	
SCALE: AS SHOWN	
DRAWN BY: A.R.S.	DATE: JULY, 1976
CHECKED BY:	DRAWING Nº: 6437

Commercial Development consists of 2 cottage resorts, 2 marinas and the above noted tent/trailer park. A golf course is also situated fronting on Canal Lake, at Bolsover, the only community on the lake.

There is no problem with water level fluctuation on Canal Lake; the Trent Canal Authority controls the water levels with the dam west of Bolsover.

There are 583 establishments inspected on Canal Lake. Of these, 107 (18.1%) were Satisfactory, or Operating Satisfactorily; 284 (48.7%) were Seriously Defective; 117 (20.2%) were Nuisances because of improper wash water disposal; 16 (2.8%) were Nuisances because of improper toilet or solid waste disposal; 48 (8.3%) were Direct Polluters, and 11 (1.9%) were Unclassified at the time of survey.

A total of 681 lake water samples were taken; of these, 34 or 5% were considered unsafe for total body contact recreational use, i.e. more than 1000 TC per ml. or more than 100 FC per ml., 398 drinking water samples were taken; of these, 129 or 32% were considered unsafe for human consumption, i.e. more than 4 TC per ml. or more than 0 FC per ml. All cottagers who had such samples taken, were notified by mail of the results of their drinking water results, whether good or bad.

Some abatement work was conducted following the survey. Of the 181 systems determined to be faulty, 12 had been corrected by December 1975. The balance of the owners will be contacted either by mail or through interviews to obtain corrective agreements, during the winter/spring. It is hoped that abatement can be completed during the summer of 1976.

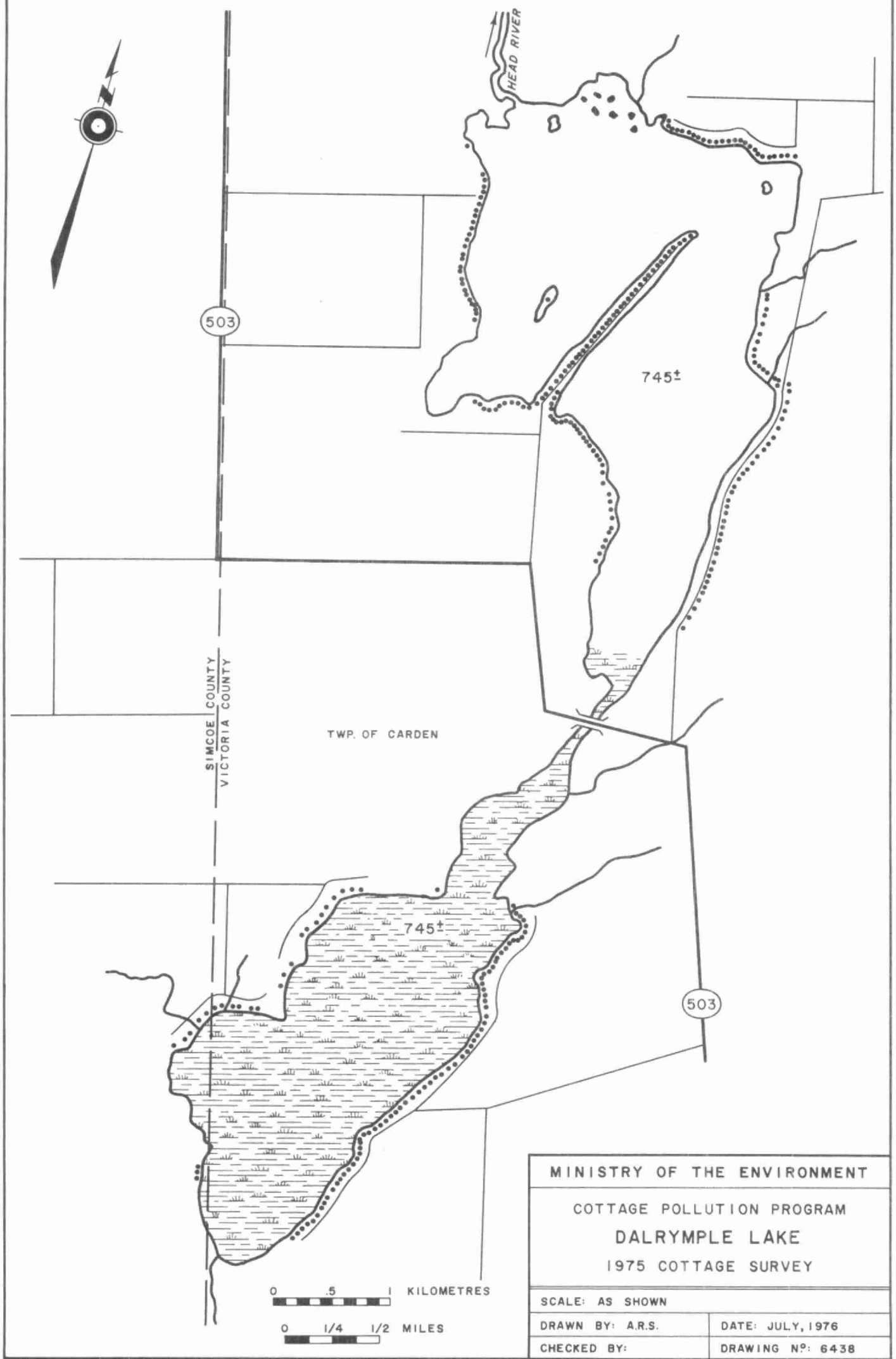
DALRYMPLE LAKE

Dalrymple Lake consists of 2 separate and distinct sections, each about 2½ sq. miles in area; Highway #503 crosses the narrows separating these two sections. All of the northern section and about ½ of the southern section lie in Carden Township, Victoria County; the balance is in Mara Township, Ontario County.

The southern section is very shallow and weedy; large stands of wild rice and reeds give it the appearance of a vast marsh by late summer. Of the 100 or so cottages in this section, nearly all are located along the south eastern shoreline, which rises rather steeply, levelling off to a plateau with much exposed limestone bedrock. The balance of the southern section's shoreline is wooded and low-lying.

The northern section of the lake is deeper (maximum depth 34 ft.) and is free of weeds, except for a few bays which are overgrown. The majority of the cottage development (385 out 485) is located in this section. Most of the land behind the lakeshore is under cultivation and only a minor portion of shoreline has low-lying land. Soil depth is generally adequate along the western shoreline, as well as along Avery Point, a unique finger-like peninsula extending over a mile out into the lake, and being only 200 - 300 feet in width.

FIGURE 3 - COTTAGE DISTRIBUTION OF DALRYMPLE LAKE



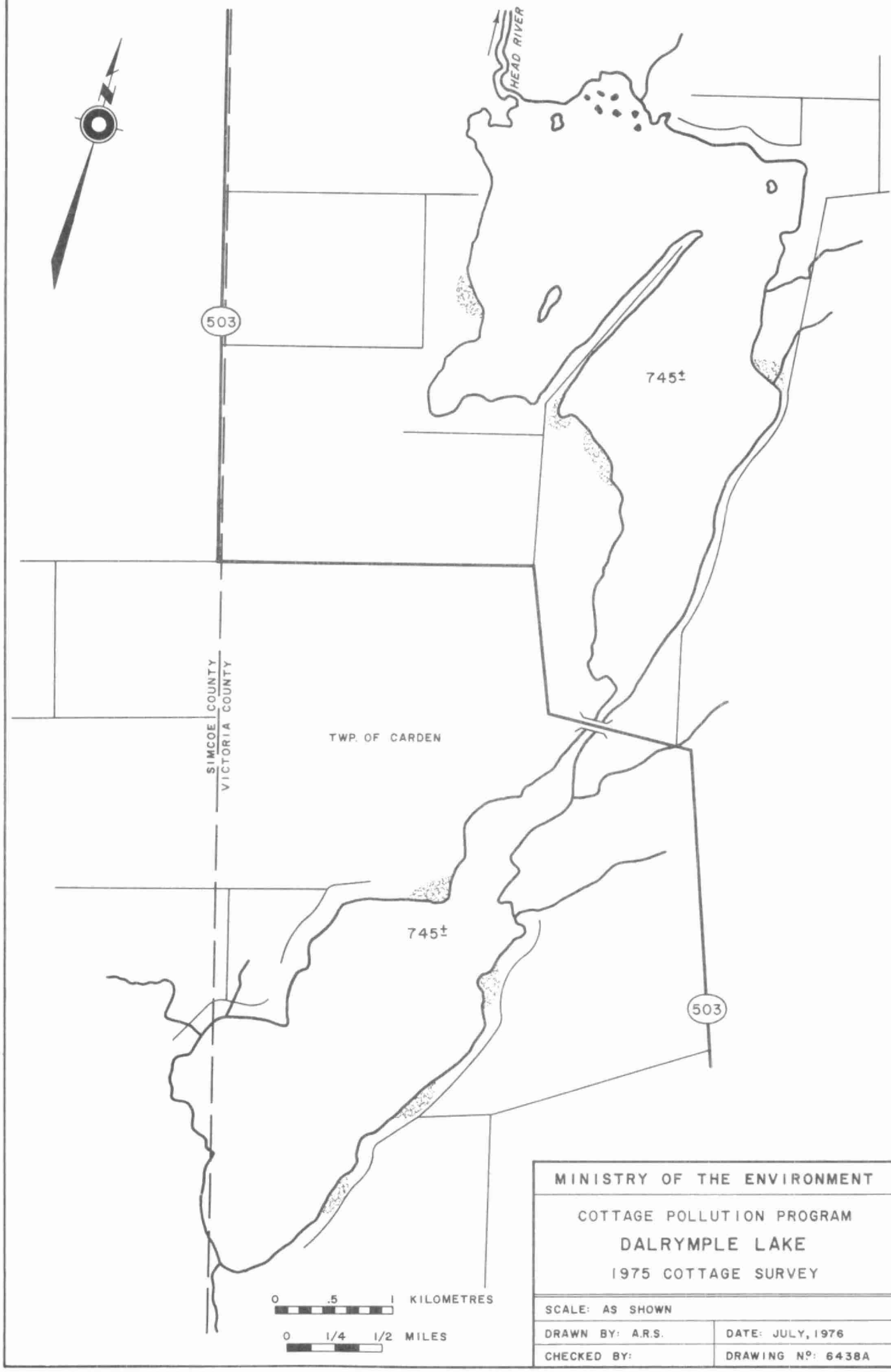
MINISTRY OF THE ENVIRONMENT	
COTTAGE POLLUTION PROGRAM DALRYMPLE LAKE 1975 COTTAGE SURVEY	
SCALE: AS SHOWN	
DRAWN BY: A.R.S.	DATE: JULY, 1976
CHECKED BY:	DRAWING Nº: 6438

The northern shoreline is quite rocky with minimal soil cover, and much exposed granite bedrock. The northern portion of the east shore has good soil cover, but the southern portion has less soil, with limestone bedrock under a shallow soil mantle.

Dalrymple Lake has 3 marinas, 4 cottage resorts and 3 tent/trailer parks. All of these facilities are located in the northern section.

Water level fluctuations on Dalrymple are quite severe. Water levels were monitored by Ministry staff at a bench-mark established at the narrows, on the western abutment of an old bridge; it was found that between May 1, 1975 and July 30, 1975, the water level dropped 53 inches or 4 ft. 5 inches; based on local information, Spring water levels were as much as a foot higher, as recently as 1971. Because of this fluctuation, many shoreline areas of the lake, because of gently or flat shorelines, suffer from flooding, with ensuing inundation of tile bed systems; these areas are shown on Figure 4. Unfortunately, this water-level fluctuation has been virtually ignored or overlooked by the Health Unit, as numerous tile fields installed in recent years with Health Unit approval are flooded during the spring run-off period.

FIGURE 4 - FLOOD-PRONE COTTAGES OF DALRYMPLE LAKE



MINISTRY OF THE ENVIRONMENT	
COTTAGE POLLUTION PROGRAM DALRYMPLE LAKE 1975 COTTAGE SURVEY	
SCALE: AS SHOWN	
DRAWN BY: A.R.S.	DATE: JULY, 1976
CHECKED BY:	DRAWING Nº: 6438A

There were 485 establishments inspected on the lake; cabins and cottages at resorts brought the total to 592 sewage systems inspected. Of these 592, only 98 (16.6%) were Satisfactory, or Performing Satisfactorily; 281 (47.5%) were Seriously Defective; 148 (25.0%) were Nuisances owing to improper wash water disposal, and 25 (4.2%) were Nuisances because of improper Toilet or Solid Waste Disposal; 32 (5.4%) were Direct Polluters -- most of these systems, although fine in appearance at time of inspection, were below the spring flood levels; 8 (1.3%) were Unclassified at the time of the survey, mostly ruinous or abandoned establishments.

A total of 586 lake water samples were taken and analysed; of these 113 or 19% were found to exceed either 1000 total coliforms per ml. or 100 faecal coliforms per ml. which is the criteria for suitability of surface waters for total bodily contact recreational use.

187 drinking water samples were analyses; 32 or 32% were found to exceed 4 TC per ml. or 0 FC per ml. which is the criteria for water safe to drink. All those who had water samples taken were notified of the results by mail, whether good or bad.

Some abatement work was carried out toward the latter part of the survey; 27 out of 205 faulty systems have been corrected as of December 1975; the balance of cottagers will be contacted either by mail or personal interviews in the winter/spring 1976 to obtain agreements for correction. It is hoped that all abatement will be completed during 1976.

Numerous instances of people washing in the lake, using soaps, detergents, and shampoos were noted. The three areas of greatest occurrences were the Township Beach; Topagee Resort's swimming area and Theis Resort's swimming area. The matter was brought to Council's attention in late August, 1975, and it was decided that a program of educating the public should be embarked upon whereby, co-operation of the resort operators and the municipality would be requested to post the swimming areas with signs discouraging such practices. This program is to commence in the Spring of 1976.

RICE LAKE - SPECIAL DETECTION SURVEY

The original cottage survey on Rice Lake was carried out in 1973. Abatement work was commenced that year and continued until 1975.

In the spring of 1975, a request was made to the Peterborough Office to re-survey 36 establishments leased from the Crown, on the Hiawatha Indian Reserve. The Department of Indian and Northern Affairs administers the leases on the Reserve, and requested current sewage disposal information on the subject properties at a time when leases were due for renewal.

In early June 1975, the re-survey was carried out on the 36 sites; 10 were classed Satisfactory or Satisfactory Performance; 6 were Seriously Defective; 5 were Nuisances (wash water); 1 was Nuisance (solid waste); 5 were assessed as Polluters, and 9 remained unclassified for lack of information.

To date, 3 systems have been corrected/reclassified from direct contact with the leaseholders, at the time of survey. It was agreed between the Ministry and the Department of Northern Affairs that the other 17 leaseholders with faulty systems were to be notified by the Department to contact the Peterborough Office and arrange for on-site inspection and correction procedures.

As of December 1975, no further contacts with the leasholders have been made. The Department is to be contacted again in the Spring of 1976 to determine what action has been taken to contact leaseholders.

BALSAM LAKE - SPECIAL DETECTION SURVEY

In early August 1975, a request for a special survey was made to the Peterborough Office; the request dealt with 16 cottages on Balsam Lake. It was felt that some cottage systems could be malfunctioning.

As a result of the request, staff from the Peterborough District Office, along with a staff member of the local Health Unit in Lindsay, carried out the inspections. Of the 16 cottage systems, 4 were Satisfactory, 6 were Nuisances (wash water) and 6 were Seriously Substandard.

To date, 4 have signed agreements for corrective work, and 2 have applied for septic or holding tank systems. Signed agreements are expected to be received and corrections carried out from the remaining 6, and work completed during the summer of 1976.

FOLLOW-UP ABATEMENT

(a) Chandos Lake

The original survey on Chandos Lake was carried out in the summer of 1974. 880 cottages were inspected that year, and abatement was completed on 233 defective systems. 59 establishments remained to be corrected for 1975; of these 48 have been corrected, 8 have agreements to complete the work in 1976; difficulties encountered in contacting the 3 remaining cottages have resulted in a problem which should be resolved during the summer of 1976.

Field work necessary to obtain the 48 corrections required a total of 95 visits to the various cottage establishments, with some cottages requiring 3 visits before the correction was completed.

Abatement on Chandos is expected to be completed in 1976.

(b) Looncall Lake

The original survey on Looncall Lake was carried out during the summer of 1975. No abatement work on this lake was carried out that year. Of a total of 81 cottages on the lake, 51 required corrections to their systems.

In the summer of 1975, 36 systems were corrected; 11 owners are to complete the work in 1976; 4 owners could not be contacted that year, and re-visits are planned for 1976.

(b) Looncall Lake (cont'd)

To obtain 36 corrections, a total of 77 site visits were made over the course of the summer.

(c) Balsam Lake

The initial survey on Balsam Lake was done in 1973. Over the ensuing years the abatement progressed so that by 1975, 125 cottages still remained uncorrected. By the end of the summer, all but one had been corrected, the remaining cottage to have its correction done for the summer of 1976.

(d) Head Lake

Survey work on Head Lake was initially carried out in 1974. There were 276 cottages on the lake, and 2 resorts.

No abatement work was done on Head Lake in 1974. 78 establishments required correction and in the summer of 1975, 76 were corrected; the remaining cottagers have agreed to complete the necessary work in 1976.

INFORMATION OF GENERAL INTEREST TO COTTAGERS

MICROBIOLOGY OF WATER

For the sake of simplicity, the micro-organisms in water can be divided into two groups: the bacteria that thrive in the lake environment and make up the natural bacterial flora; and the disease causing micro-organisms, called pathogens, that have acquired the capacity to infect human tissues.

The "pathogens" are generally introduced to the aquatic environment by raw or inadequately treated sewage, although a few are found naturally in the soil. The presence of these bacteria does not change the appearance of the water but poses an immediate public health hazard if the water is used for drinking or swimming. The health hazard does not necessarily mean that the water user will contract serious waterborn infections such as typhoid fever, polio or hepatitis, but he may catch less serious infections of gastro-enteritis (sometimes called stomach flu), dysentery or diarrhea.

Included in these minor afflictions are eye, ear and throat infections that swimmers encounter every year and the more insidious but seldom diagnosed, subclinical infections usually associated with several waterborn viruses.

These viral infections leave a person not feeling well enough to enjoy holidaying although not bedridden. This type of microbial pollution can be remedied by preventing wastes from reaching the lake and water quality will return to satisfactory conditions within a relatively short time (approximately 1 year) since disease causing bacteria usually do not thrive in an aquatic environment.

The rest of the bacteria live and thrive within the lake environment. These organisms are the instruments of biodegradation. Any organic matter in the lake will be used as food by these organisms and will give rise, in turn to subsequent increases in their numbers. Natural organic matter as well as that from sewage, kitchen wastes, oil and gasoline are readily attacked by these lake bacteria. Unfortunately, biodegradation of organic wastes by organisms uses correspondingly large amounts of the dissolved oxygen. If the organic matter content of the lake gets high enough, these bacteria will deplete the dissolved oxygen supply in the bottom waters and threaten the survival of many deep water fish species.

RAINFALL AND BACTERIA

The "Rainfall Effect" relates to a phenomena that has been documented in previous surveys of the Recreational Lakes. Heavy precipitation has been shown to flush the land area around the lake and the subsequent runoff will carry available contaminants including sewage organisms as well as natural soil bacteria with it into the water.

Total coliforms, faecal coliforms and faecal streptococci, as well as other bacteria and viruses which inhabit human waste disposal systems, can be washed into the lake. In Pre-Cambrian areas where there is inadequate soil cover and in fractured limestone areas where fissures in the rocks provide access to the lake, this phenomenon is particularly evident.

Melting snow provides the same transporation function for bacteria, especially in an agricultural area where manure spreading is carried out in the winter on top of the snow.

Previous data from sampling points situated 50 to 100 feet from shore indicate that contamination from shore generally shows up within 12 to 43 hours after a heavy rainfall.

WATER TREATMENT

Lake and river water is open to contamination by man, animals and birds (all of which can be carriers of disease); consequently, NO SURFACE WATER MAY BE CONSIDERED SAFE FOR HUMAN CONSUMPTION without prior treatment, including disinfection. Disinfection is especially critical if coliforms have been shown to be present.

Disinfection can be achieved by:

a) Boiling

Boil the water for a minimum of five minutes to destroy the disease causing organisms.

b) Chlorination Using a Household Bleach Containing 4 to 5.1/4% Available Chlorine

Eight drops of a household bleach solution should be mixed with one gallon of water and allowed to stand for 15 minutes before drinking.

c) Continuous Chlorination

For continuous water disinfection, a small domestic hypochlorinator (sometime coupled with activated charcoal filters) can be obtained from a local plumber or water equipment supplier.

d) Well Water Treatment

Well water can be disinfected using a household bleach (assuming strength at 5% available chlorine) if the depth of water and diameter of the well are known.

CHLORINE BLEACH

per 10 ft. depth of water

Diameter of Well Casing In Inches	One to Ten Coliforms	More than Ten Coliforms
4	.5 oz.	1 oz.
6	1 oz.	2 oz.
8	2 oz.	4 oz.
12	4 oz.	8 oz.
16	7 oz.	14 oz.
20	11 oz.	22 oz.
24	16 oz.	31 oz.
30	25 oz.	49 oz.
36	35 oz.	70 oz.

Allow about six hours of contact time before using the water.

Another bacteriological sample should be taken after one week of use.

Water Sources (spring, lake, well etc.) should be inspected for possible contamination routes (surface soil, runoff following rain and seepage from domestic waste disposal sites). Attempts at disinfecting the water alone without removing the source of contamination will not supply bacteriologically safe water on a continuing basis.

There are several types of low cost filters (ceramic, paper, carbon, diatomaceous earth sometimes impregnated with silver, etc.) that can be easily installed on taps or in water lines. These may be useful to remove particles if water is periodically turbid and are usually very successful. Filters, however, do not disinfect water but may reduce bacterial numbers. For safety, chlorination of filtered water is recommended.

SEPTIC TANK INTALLATIONS

In Ontario, provincial law requires under Part 7 of the Environmental Protection Act that before you extend, alter, enlarge or establish any building where a sewage system will be used, a Certificate of Approval must be obtained from the Ministry of Environment or its representatives. The local municipality or Health Unit may be delegated the authority to issue the Certificate of Approval. Any other pertinent information such as size, types and location of septic tanks and tile fields can also be obtained from the same authority.

(1) General Guidelines

A septic tank should not be closer than:

- 50 feet to any well, lake, stream, pond, spring, river or reservoir.
- 5 feet to any building.
- 10 feet to any property boundary.

The tile field should not be closer than:

- 100 feet to the nearest dug well.
- 50 feet to a drilled well which has a casing to 25 feet below ground.
- 25 feet to a building with a basement that has a floor below the level of the tile in in the tile bed.
- 10 feet to any other building.
- 10 feet to a property boundary.
- 50 feet to any lake, stream, pond, spring, river or reservoir.

The ideal location for a tile field is in a well drained, sandy loam soil remote from any wells or other drinking water sources.

For the tile field to work satisfactorily, there should be at least 3 feet of soil between the bottom of the weeping tile trenches and the top of the ground water table or bedrock.

Recognizing that private sewage systems are relatively inefficient where shallow and inappropriate soil conditions are present (e.g. Pre-Cambrian areas) the Ministry of the Environment is conducting research into alternate methods of private sewage disposal in un-sewered areas; into the improvement of existing equipment and methods of design and operation for these systems; and into the development of better surveillance methods such as by the use of chemical, biological and radioactive tracers to detect the movement of pollutants through the soil mantle.

DYE TESTING OF SEPTIC TANK SYSTEMS

There is considerable interest among cottage owners to dye test their sewage systems, however, several problems are associated with dye testing. Dye would not be visible to the eye from a system that has a fairly direct connection to the lake. Thus, if a cottager dye-tested his system and no dye was visible in the lake, he would assume that his system is satisfactory, which might not be the case.

A low concentration of dye is not visible and therefore expensive equipment such as a fluorometer is required. Only qualified people with adequate equipment are capable of assessing a sewage system by using dye. In any case, it is likely that some of the water from a septic tank will eventually reach the lake. the important question is whether all contaminants including nutrients have been removed before it reaches the lake. To answer this question special knowledge of the system, soil depth and composition, underground geology of the region and the shape and flow of the shifting water table are required. Therefore, we recommend that this type of study should be performed only by qualified professionals.

BOATING REGULATION

In order to help protect the lakes and rivers of Ontario from pollution, it is required by law that sewage (including garbage) from all pleasure craft, including houseboats must be retained in equipment of a type approved by the Ministry of Environment. Equipment which will be approved by the Ministry of the Environment includes (1) retention devices with or without circulation which retain all toilet wastes for disposal ashore, and (2) incinerating devices which reduce all sewage to ash.

To be approved, equipment shall:

1. be non-portable
2. be constructed of structurally sound material
3. have adequate capacity for expected use
4. be properly installed,
5. in the case of storage devices, be equipped with the necessary pipes and fittings conveniently located for pump-out by shore-based facilities (although not specified, a pump-out deck fitting with 1½ inch National Pipe Thread is commonly used).

An Ontario regulation requires that marinas and yacht clubs provide or arrange pump-out service for the customers and members who have toilet-equipped boats. In addition, all marinas and yacht clubs must provide litter containers that can be conveniently used by occupants of pleasure boats.

The following "Tips" may be of assistance to you in regards to boating:

1. Motors should be in good mechanical condition and properly tuned.
2. When a tank for outboard motor testing is used, the contents should not be emptied into the water.
3. If the bilge is cleaned, the waste material must not be dumped into the water.
4. Fuel tanks must not be overfilled and space must be left for expansion if the fuel warms up.
5. Vent pipes should not be obstructed and fuel needs to be dispensed at a correct rate to prevent "blow-back".

6. Empty oil cans must be deposited in a leak-proof receptacle, and

7. Slow down and save fuel.

PHOSPHORUS AND DETERGENTS

Scientists have recognized that phosphorus is the key nutrient in stimulating algae and plant growth in lakes and streams.

In the past year, approximately 50% of the phosphorus contributed by municipal sewage was added by detergents. Federal regulations reduced the phosphage content of P_2O_5 in laundry detergents from approximately 50% to 20% on August 1, 1970 and to 5% on January 1, 1973.

It should be recognized that automatic dishwashing compounds were not subject to the government regulations and that surprisingly high numbers of automatic dishwashers are present in resort areas (a questionnaire indicated that about 30 percent of the cottages in the Muskoka lakes have automatic dishwashers). Cottagers utilizing such conveniences may be contributing significant amounts of phosphorus to recreational lakes because automatic dishwashing compounds are characteristically high in phosphorus. Indeed, in most of Ontario's vacation land, the source of domestic water is soft enough to allow the exclusive use of liquid dishwashing compounds, soap and soap-flakes which are, in general, relatively low in phosphorus.

ONTARIO'S PHOSPHORUS REMOVAL PROGRAMME

By 1975, the Government of Ontario expects to have controls in operation at more than 200 municipal waste water treatment plants across the province serving some 4.7 million persons. This represents about 90 percent of the population serviced by sewers. The programme is in response to the International Joint Commission recommendations as embodied in the Great Lakes Water Quality Agreement and studies carried out by the Ministry of the Environment on inland recreational waters which showed phosphorus to be a major factor influence on eutrophication. Specifically, the programme makes provision for nutrient control in the Upper and Lower Great Lakes, the Ottawa River system and in prime recreational waters where the need is demonstrated or where emphasis is placed upon prevention of localized, accelerated eutrophication.

Phosphorus removal facilities became operational at waste-water treatment plants on December 31, 1973, in the most critically affected areas of the province, including all the plants in the Lake Erie drainage basin and the inland recreational areas. The operational date for plants for discharging to waters deemed to be in less critical condition, which includes plants larger than one million gallons per day (1 mgd) discharging to Lake Ontario and to the Ottawa River system, was December 31, 1975.

The 1973 phase of the programme involved 113 plants, of which 48 are in prime recreational areas. An additional 53 new plants, each with phosphorus removal, are now under development, 23 of which are located in recreational areas. The capacities of these plants range from 0.04 to 24.0 mgd, serving an estimated population of 1,600,000 persons.

The 1975 phase will bring into operation another 54 plants ranging in size from 0.3 to 180 mgd. serving an additional 3,100,00 persons. Treatment facilities utilizing the Upper Great Lakes, the Ottawa River Basin and certain areas of Georgian Bay where needs have been demonstrated must remove at least 80 percent of the phosphorus reaching their sewage treatment plant.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